

This listing of claims will replace all prior versions, and listings, of claims in the application.

**Listing of Claims:**

1. (currently amended) A double balanced mixer for mixing an RF input signal with a local oscillator signal to provide at an output an intermediate frequency signal, comprising:

- (a) a first diode ring having a first and second input port for receiving the local oscillator signal and a third input port for receiving the RF signal, the first diode ring further having a first output port for providing the intermediate frequency signal;
- (b) a second diode ring having a fifth and sixth input port for receiving the local oscillator signal and a seventh input port for receiving the RF signal, the second diode ring further having a third output port for providing the intermediate frequency signal;
- (c) a first balun connected across the first and second input ports and the fifth and sixth input ports for receiving the local oscillator signal;
- (d) a second balun connected to the third and seventh input ports for receiving the RF signal; and
- (e) a third balun connected to the first and third output ports for providing the intermediate frequency signal, the third balun having a fifth transformer that has a ninth and a tenth winding and a sixth transformer that has an eleventh and a twelfth winding.

2. (original) The double balanced mixer according to claim 1, wherein the first balun includes a first transformer that has a first and a second winding and a second transformer that has a third and fourth winding.
3. (original) The double balanced mixer according to claim 1, wherein the second balun includes a third transformer that has a fifth and a sixth winding and a fourth transformer that has a seventh and an eighth winding.
4. (canceled).
5. (original) The double balanced mixer according to claim 1, wherein each diode ring comprises:
  - a) a first diode having an anode and a cathode;
  - b) a second diode having an anode and a cathode, the cathode of the first diode connected to the anode of the second diode;
  - c) a third diode having an anode and a cathode, the cathode of the second diode connected to the anode of the third diode; and
  - d) a fourth diode having an anode and a cathode, the cathode of the third diode connected to the anode of the fourth diode and the cathode of the fourth diode connected to the anode of the first diode.

6. (original) The double balanced mixer according to claim 1, wherein parasitic elements of the local oscillator signal are cancelled in the second and third baluns.
7. (original) The double balanced mixer according to claim 1, wherein isolation between the local oscillator signal and the RF and intermediate frequency signals is increased.
8. (currently amended) A double balanced mixer, comprising:
- (a) a local oscillator balun operable to receive a local oscillator signal;
  - (b) a RF balun operable to receive a RF signal;
  - (c) a first mixer having a first input port coupled to the local oscillator balun, a second input port coupled to the RF balun, and an a first output port providing an intermediate frequency signal;
  - (d) a second mixer coupled in parallel with the first mixer, the second mixer having a first input port coupled to the local oscillator balun, a second input port coupled to the RF balun, and an a second output port providing an intermediate frequency signal; and
  - (e) an intermediate frequency balun coupled to the first and second output ports of the ~~first and second mixers~~, the intermediate frequency balun having a first transformer and a second transformer, the first transformer having a first winding and a second winding, the second transformer having a third winding and a fourth winding, the second winding and the fourth winding connected to an intermediate frequency port.

9. (original) The double balanced mixer according to claim 8, wherein the first and second mixers are each ring diodes.

10. (original) The double balanced mixer according to claim 9, wherein the ring diodes each comprise four diodes.

11. (currently amended) The double balanced mixer according to claim 10, wherein the local oscillator and RF baluns each have a pair of transformers.

12. (original) The double balanced mixer according to claim 11, wherein the transformers each have a pair of windings.

13. (original) The double balanced mixer according to claim 8, wherein parasitic elements of the local oscillator signal are cancelled in the RF and intermediate frequency baluns.

14. (original) The double balanced mixer according to claim 8, wherein isolation between the local oscillator signal and the RF and intermediate frequency signals is increased.

15-21. (canceled).

22. (new) A double balanced mixer for mixing an RF signal with a local oscillator signal to provide an intermediate frequency signal, comprising:

a local oscillator balun for receiving a local oscillator signal;

a radio frequency balun for receiving an RF signal;

a first diode ring and a second diode ring, the first and second diode rings connected in parallel, the first and second diode rings further connected to the local oscillator balun and the radio frequency balun, the diode rings mixing the local oscillator signal and the RF signal to produce the intermediate frequency signal; and

an intermediate frequency balun connected with the first and second diode rings, the intermediate frequency balun having a first and second transformer and an output port, the first transformer having a first winding and a second winding, the second transformer having a third winding and a fourth winding; and

the first winding connected between the radio frequency balun and the first diode ring, the second winding connected between the second diode ring and the output port, the third winding connected between the first diode ring and the output port and the fourth diode ring connected between the second diode ring and the radio frequency balun.

23. (new) The double balanced mixer according to claim 22, wherein the local oscillator and radio frequency baluns each have a pair of transformers.

24. (new) A double balanced mixer comprising:

a local oscillator balun for receiving a local oscillator signal at a local oscillator port, the local oscillator balun having first, second, third and fourth windings, the first and third windings connected to the local oscillator port;

a radio frequency balun for receiving an RF signal at an RF port, the radio frequency balun having fifth, sixth, seventh and eighth windings, the fifth and eighth windings connected to the RF port;

an intermediate frequency balun for providing an intermediate frequency signal at an intermediate frequency port, the intermediate frequency balun having ninth, tenth, eleventh and twelfth windings, the intermediate frequency port connected to the tenth and eleventh windings;

a first diode ring connected to the first and fourth windings and further connected to the ninth and eleventh windings;

a second diode ring connected to the first and fourth windings and further connected to the tenth and twelfth windings; and

the fifth winding series connected to the ninth winding, the eighth winding series connected to the twelfth winding, the diode rings mixing the local oscillator signal and the RF signal to produce the intermediate frequency signal.

25. (new) The double balanced mixer according to claim 24, wherein the second and sixth windings each have a pair of ends that are connected to ground.